In re Application of GEIDL
Serial No. 09/993,331

REMARKS

The Office action has been carefully considered. The Office action rejected claims 1-32 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,741,994 to Kang et al. ("Kang"). Applicants respectfully disagree.

By present amendment, claims 1, 15, and 30 have been amended for clarification and not in view of the prior art. Applicants submit that the claims as filed were patentable over the prior art of record, and that the amendments herein are for purposes of clarifying the claims and/or for expediting allowance of the claims and not for reasons related to patentability. Reconsideration is respectfully requested.

Applicants thank the Examiner for the interview held (by telephone) on October 5, 2005. During the interview, the Examiner and applicants' attorney discussed the claims with respect to the prior art. The essence of applicants' position is incorporated in the remarks below.

Prior to discussing reasons why applicants believe that the claims in this application are clearly allowable in view of the teachings of the cited and applied references, a brief description of the present invention is presented.

The present invention is directed, generally, to a system and method for improving the recognition accuracy on natural human input data (*e.g.*, handwritten data, speech data, and so forth) using context-biased recognition. Natural human input may be characterized as input data directly from a human such as speech or handwriting. In direct opposition, typing into a keyboard is not a form of natural human input as typing is meaningless without a keyboard interface. Speech and

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handwriting do not require a computing media or computing system in and of themselves as does such textual input.

Speech is generally composed of waveforms (*e.g.*, representing phonemes), while handwriting is maintained in the form of electronic ink, which in general corresponds to a set of X, Y coordinates input by a user, and additional state information such as an "up" or "down" state, ink thickness, pressure, writing angle and/or other state data. Notwithstanding, it will be appreciated that the present invention is applicable to virtually any type of user input that corresponds to words, characters or other symbols that can be mixed with and/or eventually converted to text.

In one exemplified embodiment, recognition accuracy for natural input data may be improved by a contextual mapping engine and by adapting to user bias data to bias recognition. Context-related information comprising rules or the like (such as specifying allowed input), and/or user bias data (such as in the form of a dictionary, word list or the like that contains character combinations biased to the user's likely intent), may be provided to the recognizer. The recognizer may use the user bias data and any rules information to interpret the natural input and return its result.

The system and method may use contextual mapping to improve recognition accuracy by biasing recognition based on the context of an input field. As natural input data is being entered into an application field, the context type of the field may be determined and used to locate context-based validation rules and context-based user bias data. When entry of the natural input data may be complete, the

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context-based validation rules and context-based user bias data may be provided to a recognition engine with the natural input data. The recognizer may then biases its recognition result by using the rules and the user bias data to recognize the natural input. In various embodiments, a field signature generator may determine each field's context, independent of the application, and a data harvesting engine may automatically collect user bias data from various data stores. To determine the field type, each input location into which an executable program such as an application program can receive input data may be mapped in an embodiment to a unique field signature. User bias data may be obtained in an embodiment from a user-specific database (user bias database) of entries for each field type that has an associated factoid created and maintained for data input into the field.

Note that the above description is for example and informational purposes only, and should not be used to interpret the claims, which are discussed below.

Turning to the claims, independent claim 1 recites in a computing device, a computer-implemented method for recognizing natural human input, the method comprising receiving, at a system component, natural input data directed to a field of an executing program, wherein the natural input data comprises an input other than textual input, determining, external to the executing program, a context of the field, locating biasing information based on the context of the field, and providing a recognition result to the executing program, the recognition result biased by the biasing information and comprising at least one computer code corresponding to recognition of the natural input.

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The Office action rejected claim 1 as being anticipated by Kang. More specifically, the Office action contends that Kang teaches receiving, at a system component, natural input data directed to a field of an executing program. Fig. 3, element 304 of Kang is referenced. Further, the Office action contends that Kang teaches determining, external to the executing program, a context of the field. Column 7, line 42 to column 8, line 67 of Kang is referenced. Further yet, the Office action contends that Kang teaches locating biasing information based on the context of the field. Column 8, line 3 to column 9, line 21 of Kang is referenced. Finally, the Office action contends that Kang teaches providing a recognition result to the executing program, the recognition result biased by the biasing information and comprising at least one computer code corresponding to recognition of the natural input. Column 6, line 36 to column 7, line 31 of Kang is referenced. Applicants respectfully disagree.

Kang is directed, generally, to an application configured to display a GUI data input screen so that a user may input data using a keyboard to type textual information in the data input screen. When the user completes the input data entry, the user may activate an organize application. If there are sufficient fields of data input to define a meaningful record, the data may be displayed to the user for confirmation. Otherwise, the system may prompt the user that there is insufficient data to define any meaningful record. A record is considered meaningful in Kang if it contains a minimal set of fields. For example, the application requires that an entry to the contact data store must contain at least a name and a telephone field or at least a name and an address field. If there is at least one single recognizable

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and meaningful record, the sequence will proceed to a display a confirmation screen.

Significantly, Kang does not disclose providing context-related information or user bias data to a recognizer for natural input data. Rather, Kang accepts input data and then an organization application may identify the field type of each line of data and then the record type of any identified records for storing the input data in the database records. This is an opposite approach where input data is used to identify a record type for storing input data in a database record, rather than a record type and context-information being used as claimed by applicants to recognize the natural input data.

In fact, Kang *teaches away* from using context-related information or user bias data to recognize natural input data, as Kang intends the use of input data to identify a record in the data store to which logical group of data can be stored. For example, Kang discloses that a user may input data in a free form manner onto an input screen provided by an application. When the data entry is completed, the user may then invoke an organize function in the application to break the input data into logical groups that belong together and assigns tokens to these logical groups. From the assigned tokens, the application is able to identify single tokens or groups of tokens that belong to a unique field or a number of unique fields in the record of the data store. Thus, the application may identify records in the data store that may be updated with the input data. See Kang, Fig. 3 and column 5, line 14 to column 7, line 30.

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Notwithstanding these differences, claim 1 has been amended to recite that the natural input data comprises an input other than textual input. Clearly, Kang only teaches a textual input, *i.e.,* typing text via a keyboard interface. See Kang, Fig. 4 and column 6, lines 4-8. Typing into a keyboard is not a natural human communication and within the context of the present invention, it is not a natural human input. Simply put, Kang does not teach natural input data that is not textual as recited in claim 1. As such, applicants submit that claim 1 is allowable over the prior art of record for at least the foregoing reasons.

Applicants respectfully submit that dependent claims 2-14, by similar analysis, are allowable. Each of these claims depends either directly or indirectly from claim 1 and consequently includes the recitations of independent claim 1. As discussed above, Kang fails to disclose the recitations of claim 1 and therefore these claims are also allowable over the prior art of record. In addition to the recitations of claim 1 noted above, each of these dependent claims includes additional patentable elements.

For example, claims 2 additionally recites wherein the biasing information comprises a factoid including at least one validation rule and claim 4 additionally recites wherein providing a recognition result to the executing program includes providing the factoid to a recognition engine. As other examples, claims 5-7 additionally recite wherein the biasing information comprises a set of user bias data (claim 5), maintaining the set of user bias data in a user bias database, and retrieving the set of user bias data from the database by querying the database with a key that corresponds to the field (claim 6), and harvesting the user bias data

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from at least one data store accessible to the computing device (claim 7). Kang fails to teach or suggest the recitations of claims 2-14.

Turning to the next independent claim, amended claim 15 recites in a computing device having an executable program, a computer system comprising a human input recognition engine configured to convert natural input data to recognition results, wherein the natural input data comprises an input other than textual input, each recognition result comprising at least one computer code, a field determination mechanism that determines field types in fields of executable programs, at least one database that maintains biasing information for a plurality of field types, and an input system configured to: 1) receive natural input data directed to the field, 2) communicate with the field determination mechanism to obtain the field type of the field to which the natural input data is directed, 3) obtain biasing information from the database that corresponds to the field type, 4) communicate the natural input data and the biasing information to the recognition engine and receive the recognition result therefrom, and 5) provide to the executing program at least one computer code corresponding to the recognition result received from the recognition engine.

The Office action rejected claim 15 as being anticipated by Kang. More specifically, the Office action contends that Kang teaches a recognition engine configured to convert natural input data to recognition results, each recognition result comprising at least one computer code. Fig. 3, Fig. 4 and Fig. 5 of Kang are referenced. Further, the Office action contends that Kang teaches a field determination mechanism that determines field types in fields of executable

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programs. Column 7, line 42 to column 8, line 67 of Kang is referenced. Further yet, the Office action contends that Kang teaches at least one database that maintains biasing information for a plurality of field types. Column 8, line 45 to column 9, line 21 of Kang is referenced. Still further, the Office action contends that Kang teaches an input system configured to:1) receive natural input data directed to the field; 2) communicate with the field determination mechanism to obtain the field type of the field to which the natural input data is directed; 3) obtain biasing information from the database that corresponds to the field type; 4) communicate the natural input data and the biasing information to the recognition engine and receive the recognition result therefrom; and 5) provide to the executing program at least one computer code corresponding to the recognition result received from the recognition engine. Fig. 3, Fig. 4, Fig. 5, column 8, line 45 to column 9, line 21 of Kang are referenced. Applicants respectfully disagree.

As discussed above, Kang is directed to a system and method for allowing a user to input data into a system using textual input. The cited sections of Kang describe using an organization application to determine the record type from the field type of each line of input data for storing the input data in a database. However, the cited sections of Kang do not describe a field determination mechanism that determines field types in fields of executable programs and at least one database that maintains biasing information for a plurality of field types. Rather, the cited sections of Kang describe receiving data input that is directed to an input buffer instead of directed to a field of an executing program and tokenizing the input data in order to identify fields of records in a database for which it may

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apply. Thus, Kang teaches directly away from determining field types in fields of executable programs. Moreover, nowhere in Kang may there be found obtaining the field type of the field to which the natural input data is directed, obtaining biasing information from the database that corresponds to the field type, and communicating the natural input data and the biasing information to the recognition engine and receiving the recognition result therefrom.

Thus, Kang does not teach or suggest a field determination mechanism that determines field types in fields of executable programs as is recited in claim 15. Nor does Kang teach or suggest at least one database that maintains biasing information for a plurality of field types as is also recited in claim 15. Furthermore, Kang does not teach or suggest an input system configured to:1) receive natural input data directed to the field; 2) communicate with the field determination mechanism to obtain the field type of the field to which the natural input data is directed; 3) obtain biasing information from the database that corresponds to the field type; 4) communicate the natural input data and the biasing information to the recognition engine and receive the recognition result therefrom; and 5) provide to the executing program at least one computer code corresponding to the recognition result received from the recognition engine as is also recited in claim 15.

Notwithstanding these differences, claim 15 has been amended to clarify that the natural input data comprises an input other than textual input. Clearly, Kang only teaches a textual input, *i.e.*, typing text via a keyboard interface. See Kang, Fig. 4 and column 6, lines 4-8. Typing into a keyboard is not a natural human communication and within the context of the present invention, it is not a

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natural human input like handwriting or speech input. Therefore, Kang does not teach all of the recitations of claim 15 and applicants submit that claim 15 is allowable over the prior art of record for at least the foregoing reasons.

Applicants respectfully submit that dependent claims 16-29, by similar analysis, are allowable. Each of these claims depends either directly or indirectly from claim 15 and consequently includes the recitations of independent claim 15. As discussed above, Kang fails to disclose the recitations of claim 15 and therefore these claims are also allowable over the prior art of record. In addition to the recitations of claim 15 noted above, each of these dependent claims includes additional patentable elements.

For example, claims 16 additionally recites wherein the field determination mechanism includes a field signature engine that generates a field signature corresponding to the field type based on characteristics of the field and claim 19 additionally recites wherein the at least one database of biasing information comprises a database of factoids, and wherein the input system communicates the biasing information including a factoid having at least one associated validation rule to the recognition engine. As other examples, claims 21, 22, and 24 additionally recite wherein the at least one database of biasing information comprises a database of sets of user bias data, and wherein the input system communicates the biasing information including a set of user bias data to the recognition engine (claim 21), wherein the user bias data set communicated to the recognition engine is retrieved from the database of sets of user bias data based on the field type determined by the field determination mechanism (claim 22), and a data harvesting

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engine that obtains at least some of the user bias data from at least one data store accessible to the computing device (claim 24). Kang fails to teach or suggest the recitations of claims 16-29.

Turning to the last independent claim, amended claim 30 recites in a computing device, a system comprising a field determination mechanism that determines a field type in an executable program and provides a factoid associated therewith, a database of biasing information including sets of user bias data corresponding to factoids, an input system configured to receive natural input data, to obtain a factoid from the field determination mechanism, and to obtain user bias data corresponding to the factoid, wherein the natural input data comprises an input other than textual input, a human input recognizer that converts natural input data to computer codes, the recognizer configured to receive the factoid, the user bias data and the natural input data from the input system and to provide a recognition result comprising a set of at least one computer code to the input system based on the natural input data, the factoid and the user bias data, and the input system returning data to the executable program that corresponds to the recognition result.

The Office action rejected claim 30 as being anticipated by Kang. More specifically, the Office action contends that Kang teaches a field determination mechanism that determines a field type in an executable program and provides a factoid associated therewith. Column 7, line 42 to column 8, line 67 of Kang is referenced. Further, the Office action contends that Kang teaches a database of biasing information including sets of user bias data corresponding to factoids.

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Column 10, line 4-30 of Kang is referenced. Further yet, the Office action contends that Kang teaches an input system configured to receive natural input data, to obtain a factoid from the field determination mechanism, and to obtain user bias data corresponding to the factoid. Fig. 4, column 8, lines 45-67, and column 10, lines 4–30 of Kang are referenced. Still further, the Office action also contends that Kang teaches a recognizer that converts natural input data to computer codes, the recognizer configured to receive the factoid, the user bias data and the natural input data from the input system and to provide a recognition result comprising a set of at least one computer code to the input system based on the natural input data, the factoid and the user bias data. Column 8, line 3 to column 9, line 20 of Kang is referenced. Finally, the Office action contends that Kang teaches the input system returning data to the executable program that corresponds to the recognition result. Fig. 2 and Fig. 3 of Kang are referenced. Applicants respectfully disagree.

Kang is directed to a system and method that only uses textual inputs to the system. Moreover, the cited sections of Kang do not describe a field determination mechanism that determines a field type in an executable program and provides a factoid associated therewith. Rather, the cited sections of Kang describe receiving data input that is directed to an input buffer instead of directed to a field of an executing program and tokenizing the input data in order to identify fields of records in a database for which it may apply. Thus Kang teaches away from determining field types in fields of executable programs.

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Furthermore, in contrast to applicants' recitation of a database of biasing information including sets of user bias data corresponding to factoids associated with a field type in an executable program, the cited sections of Kang describe using a dictionary for identifying record fields from the tokens in a database for storing the input data. Thus, the words are used to determine which record field in the database the input data belongs to. Nowhere in Kang may there be found a database of biasing information including sets of user bias data corresponding to factoids associated with a field type in an executable program.

As such, Kang does not teach or suggest a field determination mechanism that determines a field type in an executable program and provides a factoid associated therewith as is recited in claim 30. Nor does Kang teach or suggest a database of biasing information including sets of user bias data corresponding to factoids as is also recited in claim 30. Furthermore, Kang does not teach or suggest an input system configured to receive natural input data, to obtain a factoid from the field determination mechanism, and to obtain user bias data corresponding to the factoid as is also recited in claim 30.

Notwithstanding these differences, claim 30 has been amended to recite that the natural input data comprises an input other than textual input. Clearly, Kang only teaches a textual input, *i.e.,* typing text via a keyboard interface. See Kang, Fig. 4 and column 6, lines 4-8. Typing into a keyboard is not a natural human communication and within the context of the present invention, it is not a natural human input as is speech or handwritten input. Therefore, Kang does not

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teach all of the recitations of claim 15 and applicants submit that claim 30 is allowable over the prior art of record for at least the foregoing reasons.

Applicants respectfully submit that dependent claims 31-32, by similar analysis, are allowable. Each of these claims depends directly from claim 30 and consequently includes the recitations of independent claim 30. As discussed above, Kang fails to disclose the recitations of claim 30 and therefore these claims are also allowable over the prior art of record. In addition to the recitations of claim 30 noted above, each of these dependent claims includes additional patentable elements.

For at least these additional reasons, applicants submit that all the claims are patentable over the prior art of record. Reconsideration and withdrawal of the rejections in the Office action is respectfully requested and early allowance of this application is earnestly solicited.

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CONCLUSION

In view of the foregoing remarks, it is respectfully submitted that claims 1-32 are patentable over the prior art of record, and that the application is in good and proper form for allowance. A favorable action on the part of the Examiner is earnestly solicited.

If in the opinion of the Examiner a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney at (425) 836-3030.

Respectfully submitted,

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Date: November 15, 2005

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